SAFE HANDS & IIT-ian's PACE

MONTHLY MAJOR TEST-08 (NB-15 NEET) ANS KEY Dt. 30-06-2023

PHYSICS		CHEMISTRY		BOTANY		ZOOLOGY	
Q. NO.	[ANS]	Q. NO.	[ANS]	Q. NO.	[ANS]	Q. NO.	[ANS]
1	C	51	B	101	C	151	B
2	C	52	A	102	D	152	D
3	C	53	D	103	A	153	A
4	C	54	B	104	B	154	C
5	D	55	B	105	A	155	B
6	A	56	B	106	B	156	B
7	C	57	B	107	D	157	B
8	D	58	A	108	D	158	C
9	C	59	A	109	B	159	B
10	D	60	C	110	C	160	B
11	A	61	A	111	C	161	A
12	B	62	C	112	D	162	B
13	B	63	A	113	C	163	B
14	A	64	C	114	B	164	B
15	D	65	B	115	B	165	B
16	D	66	C	116	B	166	B
17	BONUS	67	B	117	D	167	C
18	BONUS	68	D	118	A	168	D
19	C	69	A	119	D	169	B
20	D	70	C	120	D	170	D
21	B	71	A	121	C	171	B
22	B	72	C	122	B	172	D
23	BONUS	73	D	123	A	173	B
24	B	74	B	124	A	174	C
25	A	75	C	125	C	175	A
26	B	76	B	126	C	176	B
27	C	77	C	127	C	177	C
28	B	78	C	128	B	178	A
29	C	79	A	129	C	179	A
30	C	80	C	130	A	180	D
31	C	81	B	131	C	181	B
32	D	82	A	132	A	182	C
33	D	83	B	133	B	183	D
34	A	84	C	134	A	184	D
35	BD	85	D	135	B	185	A
36	A	86	B	136	D	186	D
37	C	87	A	137	D	187	B
38	B	88	B	138	BONUS	188	B
39	A	89	A	139	C	189	C
40	D	90	C	140	C	190	B
41	B	91	A	141	C	191	C
42	A	92	B	142	A	192	A
43	B	93	B	143	B	193	C
44	A	94	A	144	B	194	B
45	B	95	B	145	D	195	C
46	D	96	B	146	C	196	C
47	A	97	A	147	C	197	D
48	C	98	D	148	B	198	C
49	B	99	D	149	C	199	D
50	C	100	A	150	A	200	B

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MMT-08 (NEET)

Physics Answer key & Solutions

: ANSWER KEY :

1)	d	2)	c	3)	c	4)	c	33)	d	34)	a	35)	b & d	36)	a
5)	d	6)	a	7)	c	8)	d	37)	c	38)	b	39)	a	40)	d
9)	c	10)	d	11)	a	12)	b	41)	b	42)	a	43)	b	44)	a
13)	b	14)	a	15)	d	16)	d	45)	b						
17)	bonus	18)	bonus	19)	c	20)	d	46)	d	47)	a	48)	c	49)	b
21)	b	22)	b	23)	bonus	24)	b	50)	c						
25)	a	26)	b	27)	c	28)	b								
29)	c	30)	c	31)	c	32)	d								

: HINTS AND SOLUTIONS :

Single Correct Answer Type

1 **(d)**

Force on the car

$F = \mu R$

or $ma = \mu mg$ ($\because R = mg$)

or $a = \mu g$

Now from 2nd equation of motion

$s = ut + \frac{1}{2}at^2$

or $s = 0 + \frac{1}{2}at^2$ ($\because u = 0$)

or $t = \sqrt{\frac{2s}{\mu g}}$

$\therefore t = \sqrt{\frac{2s}{\mu g}}$

or $t \propto \frac{1}{\sqrt{\mu}}$

2 **(c)**

Mass measured by physical balance remains unaffected due to variation in acceleration due to gravity

3 **(c)**

Apparent weight of the man, $R = m(g + a)$

$= m(g + 4g) = 5mg$

4 **(c)**

Mass and volume of the gas will remain same, so density will also remain same

5 **(d)**

From Stefan law, the energy radiated by sun is given by. $P = \sigma e A T^4$, assuming e=1 for sun.

In Ist case, $P_1 = \sigma e \times 4\pi R^2 \times T^4$

In 2nd case, $P_2 = \sigma e \times 4\pi(2R^2) \times (2T^4)$

$= \sigma e \times 4\pi R^2 \times T^4 \times 64 = 64P_1$

The rate at which energy is received by earth is,

$E = \frac{P}{4\pi R_{SE}^2} \times A_E$

where A_E= area of earth

R_{SE}= distance between sun and earth

So, In Ist case, $E_1 = \frac{P_1}{4\pi R_{SE}^2} \times A_E$

$E_2 = \frac{P_2}{4\pi R_{SE}^2} \times A_E = 64E_1$

7 **(c)**

$\vec{\tau} = \frac{d\vec{L}}{dt}$, if $\tau = 0$ then $\vec{L}$ = constant $i.e. L$ remains constant in magnitude and as well as in direction

8 **(d)**

According to conservation of angular momentum,

$I\omega$ =constant

ie, we can write

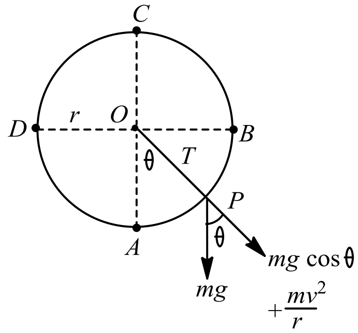
$I_1\omega_1 = I_2\omega_2$

or $MR^2\omega = (M + 4m)R^2\omega_2$

or $\omega_2 = \left(\frac{M}{M+4m}\right)\omega$

9 **(c)**

Net force towards centre=centripetal force



$T - mg\cos\theta = \frac{mv^2}{r}$

At point C, $\theta = 180°$

$T + mg = \frac{mv^2}{r}$

$\Rightarrow \quad mg < \frac{mv^2}{r}$

10 **(d)**

Work done $W = F \times s$

$W \propto \frac{1}{2}(x) \therefore W \propto x^0$

11 **(a)**

$1\ kcal = 10^3\ Calorie = 4200\ J = \frac{4200}{3.6 \times 10^6} kWh$

$\therefore 700\ kcal = \frac{700 \times 4200}{3.6 \times 10^6} kWh = 0.81 kWh$

12 **(b)**

Dimension of work and torque = $[ML^2T^{-2}]$

13 **(b)**

One femtometre is equivalent to 10^{-15} m

ie, 1fm = 10^{-15} m

14 **(a)**

When metal sphere is placed inside a charged parallel plate capacitor, the electric lines of force will not enter the metallic conductor as $E = 0$inside a charged conductor. Moreover, the surface of a charged conductor is an equipotential surface and hence, electric lines of force are always perpendicular to equipotential surface.

15 **(d)**

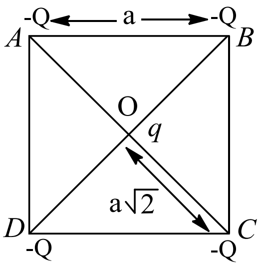
For equilibrium net electric force on any charge (say charge $-Q$ at A) should be zero. Hence,

$\vec{F}_A = \vec{F}_{AB} + \vec{F}_{AD} + \vec{F}_{AC} + \vec{F}_{AO} = \vec{O}, \vec{F}_{AB} = \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{a^2}$ along $BA, \vec{F}_{AD} = \frac{1}{4\pi\varepsilon_0}.\frac{Q^2}{a^2}$ along $DA, \vec{F}_{AC} = \frac{1}{4\pi\varepsilon_0}.\frac{Q^2}{a^2}$ along CA, and $\vec{F}_{OA} = -\frac{1}{4\pi\varepsilon_0}.\frac{2Qq}{a^2}$ along AO

Resultant of $\vec{F}_{AB}$ and $\vec{F}_{AD} = \frac{1}{4\pi\varepsilon_0}.\frac{Q^2}{a^2}\sqrt{2}$ along COA,

$\therefore \vec{F}_A = \frac{1}{4\pi\varepsilon_0}.\frac{Q^2}{a^2}\sqrt{2} + \frac{1}{4\pi\varepsilon_0}.\frac{Q^2}{2a^2} - \frac{1}{4\pi\varepsilon_0}.\frac{2Qq}{a^2} = \vec{O}$

$\Rightarrow q = \frac{Q}{4}(1+2\sqrt{2})$



19 **(c)**

Energy stored= work done

So $E = \frac{1}{2}kr^2$

or $r = \sqrt{\frac{2E}{k}} = \sqrt{\frac{2\times2}{400}} = \frac{1}{10}$ m

$$a = \omega^2 r = \left(\sqrt{\frac{k}{m}}\right)^2 \times \frac{1}{10}$$

$$= \left(\frac{400}{1}\right) \times \frac{1}{10} = 40 \text{ ms}^{-2}$$

20 **(d)**

Maximum KE= $\frac{1}{2}m\omega^2A^2$; minimum KE=0

Average KE= $\frac{0+\frac{1}{2}m\omega^2A^2}{2} = \frac{1}{4}m\omega^2A^2$

Similarly average PE= $\left(\frac{0+\frac{1}{2}m\omega^2A^2}{2}\right)/2$

$$= \frac{1}{4}m\omega^2A^2$$

21 **(b)**

$T = 2\pi\sqrt{\frac{l}{g}} \Rightarrow l \propto T^2$ [Equation of parabola]

22 **(b)**

Electrostatic energy density $\frac{dU}{dV} = \frac{1}{2}K\varepsilon_0E^2$

$$\therefore \frac{dU}{dV} \propto E^2$$

24 **(b)**

Both points are at same distance from the charge

25 **(a)**

$$g' = \frac{gR^2}{(R+h)^2}$$

$$= 980 \times \left(\frac{6400}{6400+64}\right)^2 = 960\text{cms}^{-2}$$

26 **(b)**

$$v \propto R\sqrt{\rho} \;\therefore \frac{v_p}{v_e} = \frac{R_p}{R_e} \times \sqrt{\frac{\rho_p}{\rho_e}} = 4 \times \sqrt{9} = 12$$

$\Rightarrow v_p = 12v_e$

27 **(c)**

Landsats 1 through 3 operated in a near polar orbit at an altitude of 920 km with an 18 day repeat coverage cycle. These satellites circled the earth every 103 min completing 14 orbits a day.

28 **(b)**

Here $v = 144\ km/h = 40 m/s$

$v = u + at \Rightarrow 40 = 0 + 20 \times a \Rightarrow a = 2\ m/s^2$

$\therefore s = \frac{1}{2}at^2 = \frac{1}{2} \times 2 \times (20)^2 = 400\ m$

29 **(c)**

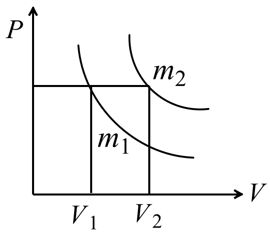
$$v_{av} = \frac{2v_1v_2}{v_1+v_2} = \frac{2\times40\times60}{100} = 48\ kmph$$

30 **(c)**

$$\mu_1 = \frac{PV}{RT}, \mu_2 = \frac{PV}{RT}$$

$$P' = \frac{(\mu_1+\mu_2)RT}{V} = \frac{2PV}{RT} \times \frac{RT}{V} = 2P$$

31 **(c)**



$$PV = \mu RT = \frac{m}{M}RT$$

For 1st graph,

$P = \frac{m_1}{M}\frac{RT}{V_1}$ ...(i)

For 2nd graph,

$P = \frac{m_2}{M}\frac{RT}{V_2}$ ...(ii)

Equating the two, we get, $\frac{m_1}{m_2} = \frac{V_1}{V_2} \Rightarrow m \propto V$

As $V_2 > V_1 \Rightarrow m_1 < m_2$

32 **(d)**

$l \propto \frac{FL}{\pi r^2 Y} \Rightarrow l \propto \frac{L}{r^2}$ [F and Y are constant]

$\frac{l_1}{l_2}=\frac{L_1}{L_2}\left(\frac{r_2}{r_1}\right)^2=\frac{1}{2}(\sqrt{2})^2 \therefore \frac{l_1}{l_2}=1:1$

33 **(d)**

$\text{Stress}=\frac{\text{Force}}{\text{area}}$

In the present case, force applied and area of cross-section of wires are same, therefore stress has to be the same

$\text{Strain}=\frac{\text{Stress}}{Y}$

Since the Young's modulus of steel wire is greater than the copper wire, therefore, strain in case of steel wire is less than that in case of copper wire

34 **(a)**

From $\Delta Q=m\,C_p(\Delta T)$

$70=2\times C_p\times(35-30)$,

$\therefore\ C_p=70/10=7\text{ cal (mol°C)}^{-1}$

$C_v=C_p-R=7-2=\text{cal/mol°C}$

$\Delta Q'=n\,C_v(\Delta T)=2\times5\times5=50\text{ cal}$

35 **(d)**

Process CD is isochoric as volume is constant, process DA is isothermal as temperature constant and process AB is isobaric as pressure is constant

36 **(a)**

$\mathrm{I}=\int\frac{2x}{(2x+1)^2}dx$

$\mathrm{I}=\int\frac{2x+1-1}{(2x+1)^2}dx$

$\mathrm{I}=\int(\frac{1}{2x+1}-(2x+1)^{-2})dx$

$\mathrm{I}=\frac{1}{2}\log|2x+1|+\frac{1}{2(2x+1)}+c$

37 **(c)**

The force of surface tension pulls the plates towards each other

38 **(b)**

$V=a_1a_2\sqrt{\frac{2(p_1-p_2)}{\rho(a_1^2-a_2^2)}}$

$=\pi r_1^2\times\pi r_2^2\sqrt{\frac{2(p_1-p_2)}{\rho[(\pi r_1^2)^2-(\pi r_2^2)^2]}}$

$=\pi r_1^2r_2^2\sqrt{\frac{2(p_1-p_2)}{\rho(r_1^4-r_2^4)}}$

$=\frac{22}{7}\times(0.1)^2$

$\times(0.04)^2\sqrt{\frac{2\times10}{(1.25\times10^3)[(0.1)^4-(0.04)^4]}}$

$=6.4\times10^{-4}\text{ m}^3\text{s}^{-1}$

39 **(a)**

Minimum speed at the lowest point

$=\sqrt{5rg}=\sqrt{5\times5\times9.8}=15.65\text{ ms}^{-1}$

40 **(d)**

$|\vec{a}\times\vec{b}|=ab\ \sin\theta$

$\sin\theta$ cannot be greater than 1.

$\therefore|\vec{a}\times\vec{b}|$ cannot be greater than ab.

Matrix Match Type

41 **(b)**

The moment of inertia of a ring about its diameter $=\frac{1}{2}MR^2$

The moment of inertia of a disc about its diameter $=\frac{1}{4}Ma^2$

The moment of inertia of an annular disc about its diameter $=\frac{1}{4}M(R_1^2+R_2^2)$

42. (a) Just be careful due to multiple

Assertion - Reasoning Type

43 **(b)**

The last number is most accurate because it has greatest significant figure (3).

44 **(a)**

When dipole is aligned along the direction of electric field, torque on its is zero and its electrical potential energy is minimum ($U=-pE$).Hence it is in a stable equilibrium condition

45 **(b)**

Two electric field lines do not intersect one another because if they do then at the point of intersection there will be two possible directions of electric field which is impossible. Electric field lines always start from a positive charge and end on a negative charge. Reason is true but not explaning assertion.

46 **(d)**

Gravitational force is the dominating force in nature and not coulomb's force. Gravitational force is the weakest force. Also, Coulomb's force >> gravitational force

47 **(a)**

In a hollow spherical shield, the charge is present only on its surface but charge is zero at every point inside the hollow sphere. Hence, the metallic shield in form of hollow shell may be built to block an electric field

48. (c)

49 **(b)**

Both, assertion and reason are correct but reason is not the correct explanation of assertion

50. **(d)**

When velocity at the lowest point is $\sqrt{5gr}$, velocity at highest point = $\sqrt{gr}$ ≠zero. That is why, the vertical loop is completed